

**CITY OF ROCKLAND (PWS 6390019)**  
**SOURCE WATER ASSESSMENT FINAL REPORT**

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**September 5, 2001**



**State of Idaho**  
**Department of Environmental Quality**

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the Act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Source Water Assessment for the City of Rockland, Idaho*, describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The City of Rockland (Public Water System Number 6390019) drinking water system consists of two ground water sources: Well #1 and Well #2. These wells are located on a hill on the eastside of Rockland and pump directly into the distribution system. For this assessment, a review of laboratory tests for the Rockland system was conducted using the Idaho Drinking Water Information Management System (DWIMS) and hardcopy laboratory information. Between June 1996 and July 1999, total coliform bacteria were detected at various locations within the distribution system. When total coliform bacteria was present in the system on November 30, 1998, the system was chlorinated, flushed and retested. All samples retested were absent of total coliform bacterial. After July of 1999, all water sample results have tested absent for total coliform bacteria.

According to DWIMS and hardcopies of laboratory results, no volatile organic chemicals (VOC) or synthetic organic chemicals (SOC) were detected in the water samples taken at the main line or manifold of Well #1 and Well #2. However, there have been several inorganic chemicals (IOCs) identified in the system. Between 1982 and 1998, water samples taken at the manifold have detected arsenic, barium, chromium, fluoride, nitrate, iron, sulfate and sodium. These detections were below each contaminant's maximum contaminant level (MCL). The nitrate results ranged from 0.70 to 0.83 mg/l and were well below the MCL of 10.0 mg/l. Arsenic has been found twice in the system at 0.005 mg/l (MCL for arsenic is 0.05 mg/l).

A Sanitary Survey was conducted in 1999 for Rockland providing an overview of the public water system including modifications made to the system (Idaho Division of Environmental Quality, 1999). No system violations were stated within this survey. Susceptibility ratings for the City of Rockland system were based upon agricultural land use, shallow depth to water, poor to moderately drained soils, and the subsurface material within the vadose zone (zone from land surface to the water table) (Idaho Division of Environmental Quality Source Water Assessment Plan, 1999, E-59). The final susceptibility ranking for Well #1 and Well #2 was moderate for IOCs, VOCs, SOCs, and microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the City of Rockland, source water protection activities should continue their efforts in keeping the water system in compliance and free of contaminants that may affect the drinking water system. If contaminants are detected in the system at or above their MCL, the City of Rockland should take appropriate measures to treat the water source. Treatments, such as disinfectant and filtration for microbials, and reverse osmosis for IOCs, should be investigated to remedy these problems. Any new sources that could be considered potential contaminant sources in Well #1 and Well #2 zones of contribution should be monitored to prevent future contamination. Also, preventative measures should be taken if the well lot areas are planted with grass. Lawn chemicals and/or pesticides should not be applied within 50 feet of the wellhead. Partnerships with state and local agencies, and industrial groups should be established and are critical to success. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Power County Soil Conservation District, and the Natural Resources Conservation Service.

# SOURCE WATER ASSESSMENT FOR CITY OF ROCKLAND POWER COUNTY, IDAHO

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are attached. The list of significant potential contaminant source categories and their rankings used to develop the assessment also is attached.

### Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

## Section 2. Conducting the Assessment

### General Description of the Source Water Quality

The City of Rockland is a community public drinking water system serving approximately 300 persons. The water system is located approximately 12 miles south of the City of American Falls (Figure 1). The system consists of two wells located on a hill at the southern end of the community. According to the 1999 Sanitary Survey, Well #1 is the secondary water supply well and is turned on to exercise the pump. It is also used during peak demand periods. Well #2 is considered the primary water source. The average production rate for the wells is approximately 45,000 gallons per day (Idaho Division of Environmental Quality, 1999). Water samples for the system are taken from the manifold location for Well #1 and Well #2.

Although inorganic chemicals (arsenic, barium, cadmium, chromium, fluoride, iron, nitrate, sulfate and sodium) were identified in the public water system, the reported concentrations of these contaminants were below their MCL. The IOCs mentioned above with the exception of sodium have not been detected in the system since 1995. The nitrate levels ranged from 0.70 mg/l to 0.83 mg/l from February 1982 to August 1990 are below the MCL of 10.0 mg/l. Arsenic was identified in the system in August 1990 and July 1995. Both detects were 0.005 mg/l and were below the MCL of 0.05 mg/l. No VOCs or SOCs have been detected in the system.

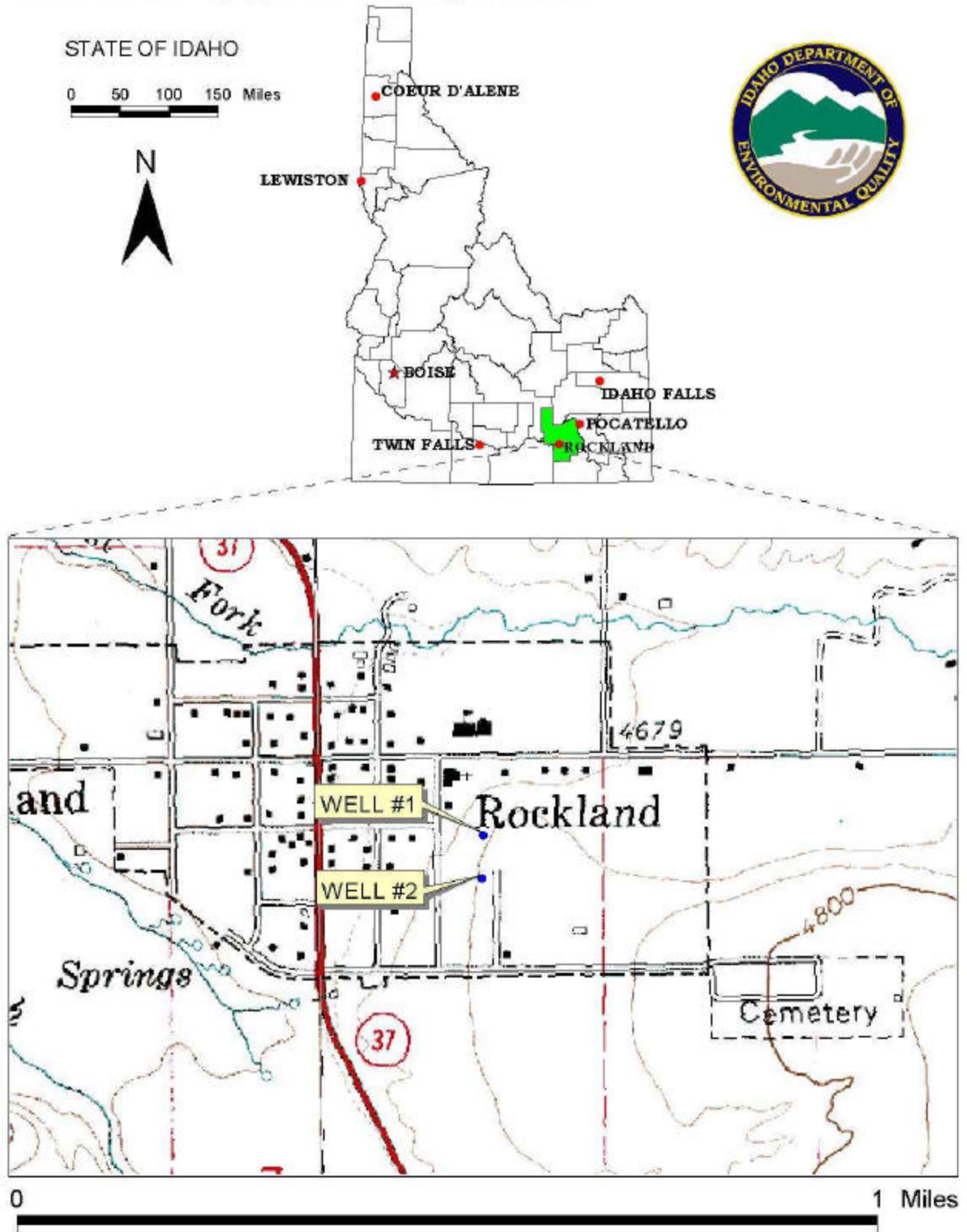
### **Defining the Zones of Contribution – Delineation**

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel (TOT) zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a refined computer model approved by the EPA in determining the 3-year (Zone 1B), 6-year (Zone 2), and 10-year (Zone 3) TOT for water associated with the Rockland Valley Hydrologic Province in the vicinity of the City of Rockland. The computer model used site-specific data, assimilated by WGI from a variety of sources including the City of Rockland well logs, operator records, and hydrogeologic reports summarized below.

The Rockland Valley Hydrologic Province is approximately 221 square miles of the southeastern Idaho Snake River drainage. Rockland Valley was formed by basin-and-range extension with the long axis trending in a north-south direction. The elevations within the larger Rockland basin range from 4,200 feet above mean sea level (msl) at the northern end where Rock Creek converges with the Snake River and 8,700 feet msl at Deep Creek Peak found at the valley's eastern border in the Deep Creek Mountains. The Sublet Range bounds the valley to the west (Washington Group International, Inc., 2001, p. 4-5).

Rock Creek is the main perennial stream within the Rockland Valley and drains northward into the Snake River. The streams and aquifers within the Rockland Basin are hydraulically connected. Subsurface material forming the major aquifers in the Rockland Basin include alluvium (stream deposits), volcanic and sedimentary rocks. The sedimentary rocks are highly faulted and fractured with few well-defined stream channels to suggest that the subsurface materials may easily absorb and transmit water through the ground water system. The principal aquifers in the northern portion of the Rockland Basin consist of basalt and sedimentary rocks interbedded with volcanic rocks. In this area, the ground water is in general under water table conditions and is associated with fractures, joints, and breccia (broken fragments held together by a fine-grained matrix) found within separate lava flows and sand and gravel. The central and southern portions of the valley consist of sand and gravel sequences within sedimentary rocks creating similar ground water under water table conditions as in the northern portion of the valley and may also have localized artesian conditions (Washington Group International, Inc., 2001, p. 4).

**FIGURE 1. Geographic Location of Rockland**



The main source of recharge is precipitation in the higher elevations bordering the Rockland Basin. There is also recharge by percolation (slow movement of water through porous material) from stream channels, irrigation canals and fields, or rainfall onto the valley floor. The average precipitation accumulation in the Rockland Basin is 17.3 inches per year. The ground water movement will generally follow surface drainage toward the major stream channels such as Rock Creek, and will move north toward the Snake River. The average water-table gradient for the valley is approximately 25 feet per mile, and the slope is toward the mouth of Rock Creek (Washington Group International, Inc., 2001, p. 4).

The zones of contribution for the Rockland wells are mostly rectangular in shape with Well #2 delineation's tapering slightly toward the wellhead (Figure 2, 3). The actual data used by WGI in determining hydrogeological assessment and the delineation areas used for the source water assessment are available from DEQ upon request.

### **Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ and from available databases.

The dominant land use outside Rockland City area is agricultural. Land use within the immediate area of the wellheads is predominantly agriculture and urban.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used by the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

### **Contaminant Source Inventory Process**

A two-phased contaminant inventory of the study area was conducted during May 2001. The first phase involved identifying and documenting potential contaminant sources within Rockland source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The City of Rockland and individuals from DEQ then conducted the second phase, or enhanced, inventory to validate the sources identified in phase one and to identify additional potential sources of contamination in the delineated source water assessment area. At the time of the enhanced inventory no additional potential contaminant sources were found within the delineated source water area. (Figure 2, 3).

Figure 2. City of Rockland Delineation Map

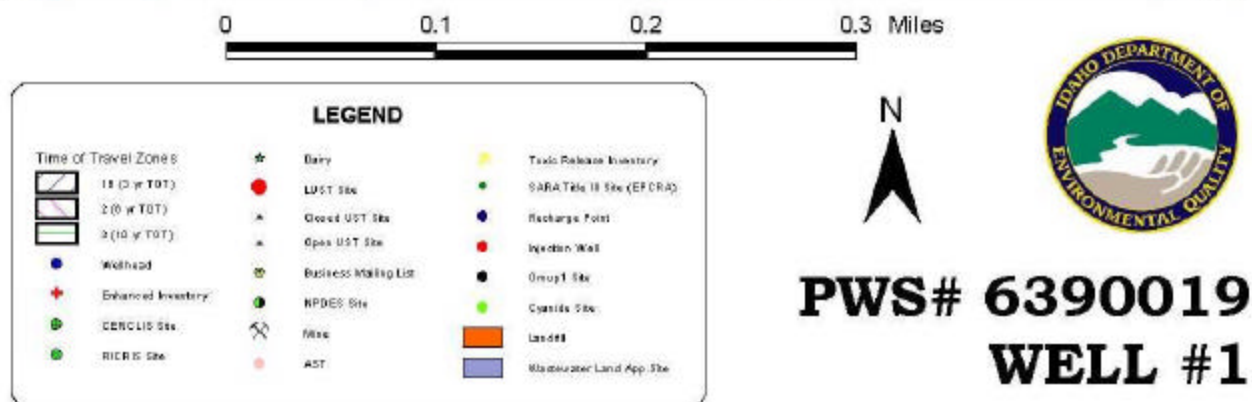
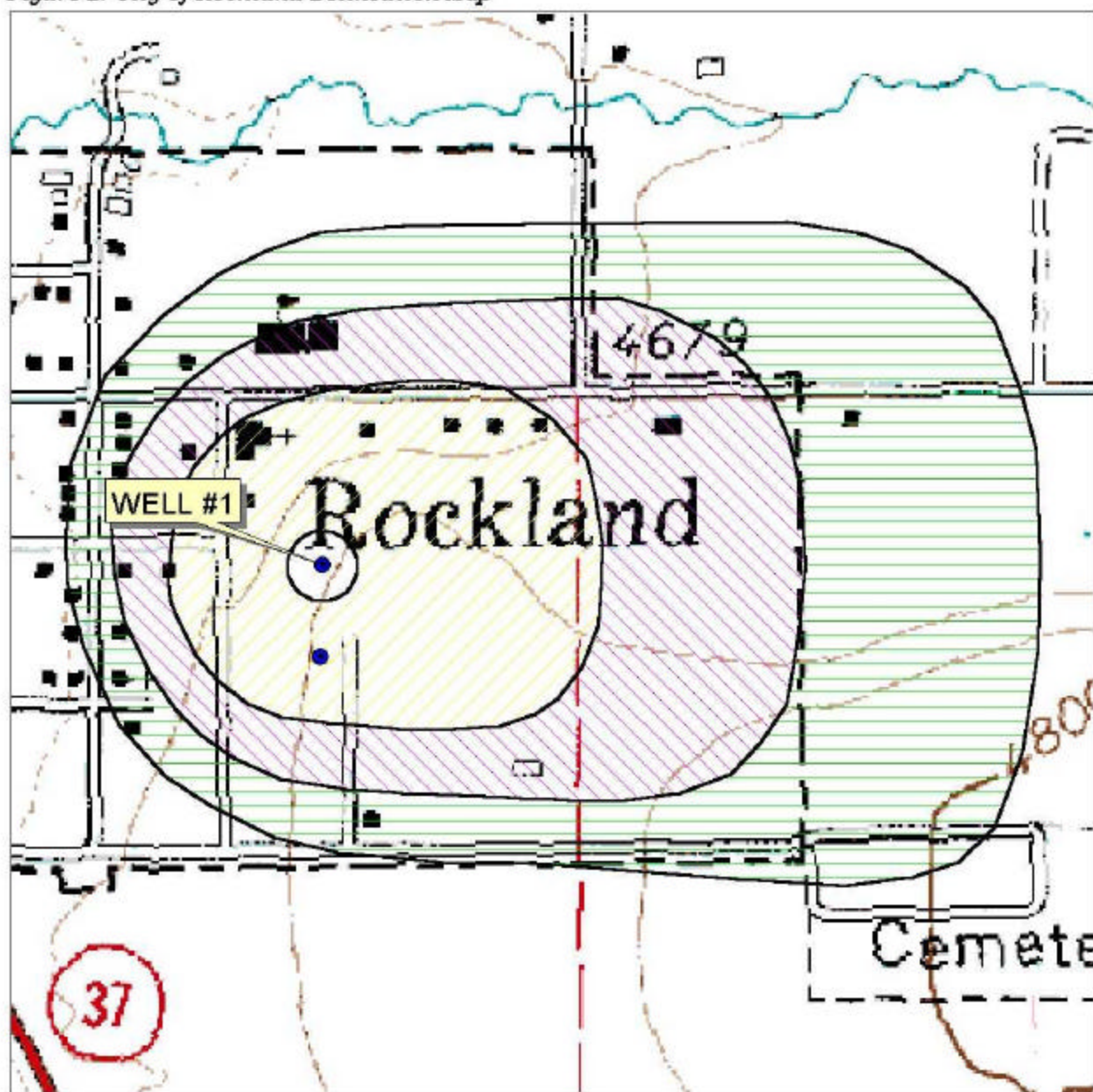
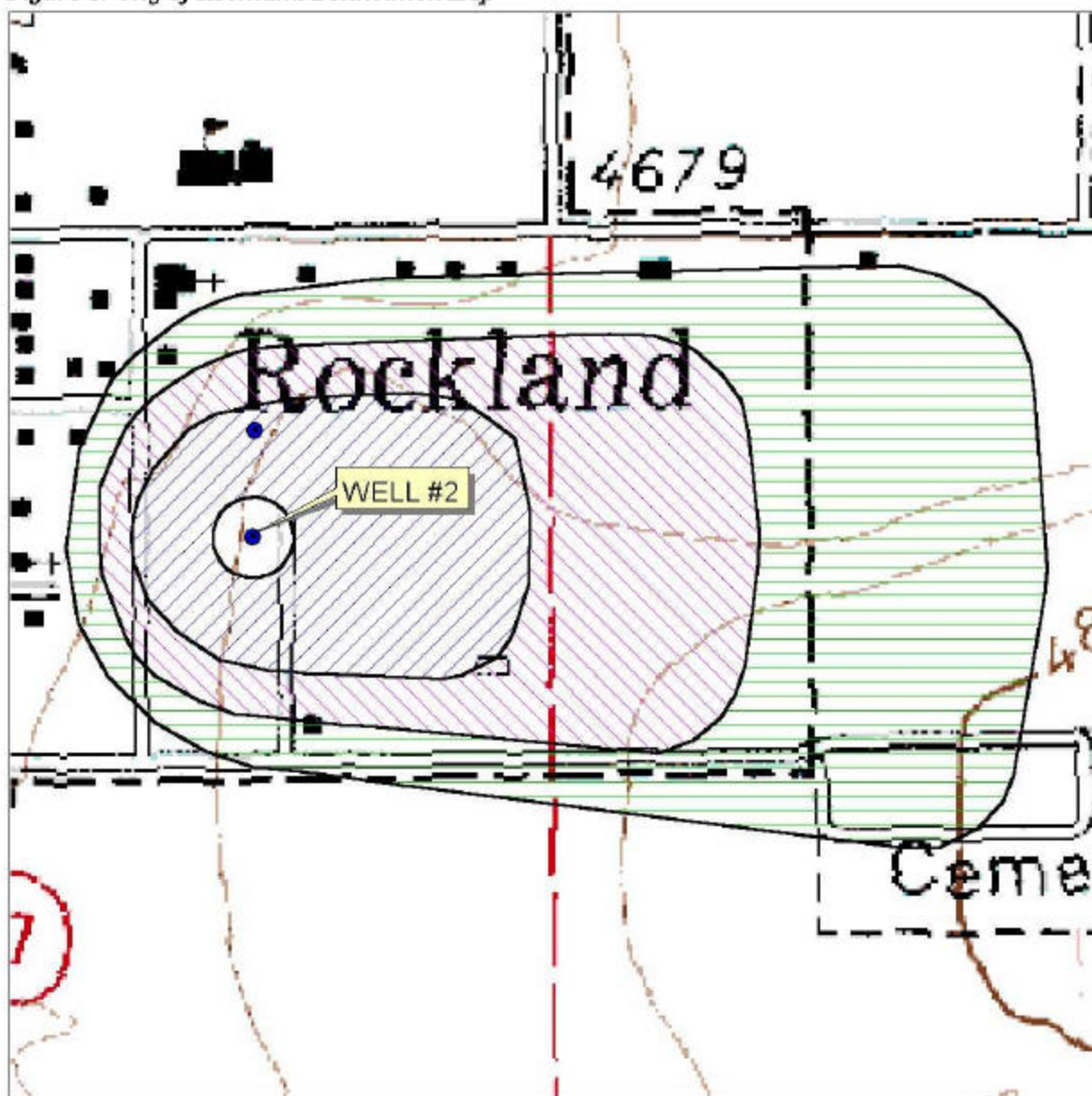


Figure 3. City of Rockland Delineation Map



  
**PWS# 6390019**  
**WELL #2**



### **Section 3. Susceptibility Analyses**

The susceptibility of the wells to contamination was ranked as high, moderate, or low risk according to the following considerations hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking.

#### **Hydrologic Sensitivity**

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The hydrologic sensitivity was rated moderate for Well #1 and low for Well #2 (Table 1). This is based upon poor to moderately drained soil classes, the vadose zone composition of predominantly sandstone and clay, and the first depth to ground water is less than 300 feet from the surface. In addition, the Idaho Department of Water Resources (IDWR) Well Driller's Report for Well #2 shows that there is at least 50 feet cumulative thickness of low permeability material that could reduce the downward movement of contaminants (correspondence, June 2001).

#### **Well Construction**

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect the water. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is greater than 100 feet below the water table, then the system is considered to have better buffering capacity. When the information available was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current public water system (PWS) construction standards are met.

According to the 1999 sanitary survey, the drinking water system consists of two wells that utilize the ground water for residential and commercial uses. Well #1 is considered the backup source, while Well #2 is the primary source of water for the system (Idaho Division of Environmental Quality, 1999). The well system construction scores were rated moderate for Well #1 and Well #2 (Table 1). The wellheads and surface seals for both wells are properly maintained and neither well is located within a 100-year floodplain. When the wellhead and well house are properly constructed, and the well is built outside of a surface flooding area, there is additional protection from surface contamination.

The IDWR Well Driller's Reports were available for both wells (correspondence, June 2001). The highest water production zones for Well #1 and #2 are 100 feet below static water level. Water drawn from deeper levels of the aquifer can provide a buffer from contaminants. The casing does not extend into low permeability units for both wells, increasing the wells susceptibility to laterally migrating contamination. The casing thickness for Well #1 and Well #2 does not meet the recommended IDWR standards for a public water system (PWS) of 0.375 inches for 12-inch or greater diameter casing as listed in the Recommended Standards for Water Works (1997). A thicker casing may prolong the life of the well.

The IDWR Well Construction Standards Rules (1993) require all PWSs to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the Recommended Standards for Water Works (1997) during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead.

### Potential Contaminant Sources and Land Use

Both Well #1 and Well #2 were rated moderate for IOCs (i.e., nitrates). For VOCs (i.e., petroleum-related products), both wells rated as low. For SOC (i.e. pesticides), Well #1 rated moderate and Well #2 rated low. For microbial contaminants (i.e., fecal coliform), Well #1 and Well #2 were both rated low. Refer to Table 1 for the susceptibility evaluation. Agricultural land is counted as a source of leachable contaminants. The points assigned to agricultural lands are based on the percentage of agricultural land. When agriculture is the predominant land use in the area, this may increase the likelihood that agricultural wastewater could infiltrate the ground water system. Refer to Figures 2 and 3 for well locations and delineated time of travel zones.

### Final Susceptibility Ranking

A detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating for the final well ranking despite the land use because a pathway for contamination already exists. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and a large percentage of agricultural land contribute greatly to the overall ranking. In terms of total susceptibility, Well #1 and Well #2 were both rated moderate for IOC, VOC, SOC, and microbial contamination (Table 1). The moderate rating reflects the system construction, hydrologic sensitivity, potential contaminants inventory and land use within the delineated source water assessment areas.

**Table 1. Summary of Rockland City Susceptibility Evaluation**

	Susceptibility Scores <sup>1</sup>									
	Hydrologic Sensitivity	Potential Contaminant Inventory and Land Use				System Construction	Final Susceptibility Ranking			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	M	L	M	L	M	M	M	M	M
Well #2	L	M	L	L	L	M	M	M	M	M

<sup>1</sup>H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility,  
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

## **Susceptibility Summary**

Arsenic, barium, chromium, fluoride, iron, nitrate, iron, sulfate and sodium represent the water chemistry history for the City of Rockland public water system, although the reported concentrations of these chemicals in the drinking water were well below the MCL for each chemical. The IOCs mentioned above with the exception of sodium have not been detected at the manifold of Well #1 and Well #2 since July 1995. In the history of the City of Rockland public water system there have been no detections of VOCs or SOCs.

The county level agriculture-chemical use is considered high in this area due a significant amount of agricultural land. Although there may only be a small portion of agriculture land in the direct vicinity of the wells, it is useful as a tool in determining the overall chemical usage, such as pesticides, and how it may impact ground water through infiltration and surface water runoff. If the agricultural land use is currently low in the defined zones of contribution for the wells, there is the potential for future contamination resulting from increased agricultural practices. In addition, no potential sources of contamination were identified within the delineated time of travel zones for Well #1 and Well #2 (Figures 2 and 3).

## **Section 4. Options for Source Water Protection**

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

A source water protection program is tailored to the particular source water area. A community with a fully developed source water protection program will incorporate many strategies. For the City of Rockland, source water protection activities should focus on implementation of practices aimed at protecting the area near the wells and continue maintaining the overall integrity of the water system. If contaminants are detected in the system at or above their MCL, the City of Rockland should take appropriate measures to treat the water source. Treatments, such as a disinfectant and filtration for microbials, and reverse osmosis for IOCs, should be investigated to remedy these problems.

The City of Rockland should focus on keeping open dialogue with local businesses and document potential IOCs, VOCs, SOCs, or microbial contaminants. Any spills from the multiple potential contaminant sources in the delineated capture zones should be monitored carefully to prevent contaminants from infiltrating the ground water. Source water protection goes well beyond the jurisdiction of Rockland. Establishing partnerships with state, county, and local agencies, commercial and industrial groups are important to protect the municipality’s sole drinking water source. Also, public education about source water will further assist the city in its monitoring efforts. Continued vigilance in keeping the wells protected from surface flooding can also keep the potential for contamination reduced. Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. Source water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the Power County Soil Conservation District, and the Natural Resources Conservation Service.

## **Assistance**

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Pocatello Regional DEQ Office      (208) 236-6160

State DEQ Office      (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, Idaho Rural Water Association, at 208-343-7001 for assistance with drinking water protection strategies.

## POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks)** – Sites with aboveground storage tanks.

**Business Mailing List** – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS** – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as “Superfund” is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site** – DEQ permitted and known historical sites/facilities using cyanide.

**Dairy** – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well** – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain** – This is a coverage of the 100-year floodplains.

**Group 1 Sites** – These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area** – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill** – Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area** – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

**NPDES (National Pollutant Discharge Elimination System)** – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas** – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point** – This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RICRIS** – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities)** – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank)** – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads** – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

## References Cited

City of Rockland, June 25, 2001. Correspondence with Mike Mathews, Operator for City of Rockland with Sean Scott, DEQ, Pocatello, Idaho, to obtain well construction information for municipal wells.

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Idaho Department of Environmental Quality, 1997. Design Standards for Public Drinking Water Systems. IDAPA 58.01.08.550.01.

Idaho Department of Water Resources, 1993. Administrative Rules of the Idaho Water Resource Board: Well Construction Standards Rules. IDAPA 37.03.09.

Washington Group International, Inc, March 2001. Source Area Delineation Report Rockland Valley Hydrologic Province.

Attachment A

City of Rockland

Susceptibility Analysis  
Worksheet

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- $\geq 13$  High Susceptibility

## 1. System Construction

SCORE

Drill Date	05/20/1970	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1999
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0

Total System Construction Score 3

## 2. Hydrologic Sensitivity

Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	NO	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	NO	2

Total Hydrologic Score 3

## 3. Potential Contaminant / Land Use - ZONE 1A

IOC Score	VOC Score	SOC Score	Microbial Score
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Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	0	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	4	2

## Potential Contaminant / Land Use - ZONE 1B

Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2 ) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	YES	4	0	0	
4 Points Maximum		4	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B Greater Than 50% Irrigated Agricultural Land		4	4	4	4

Total Potential Contaminant Source / Land Use Score - Zone 1B 8 4 4 4

## Potential Contaminant / Land Use - ZONE II

Contaminant Sources Present	NO	0	0	0
Sources of Class II or III leacheable contaminants or	YES	1	0	0
Land Use Zone II Greater Than 50% Irrigated Agricultural Land		2	2	2

Potential Contaminant Source / Land Use Score - Zone II 3 2 2 0

## Potential Contaminant / Land Use - ZONE III

Contaminant Source Present	NO	0	0	0
Sources of Class II or III leacheable contaminants or	YES	1	0	0
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1

Total Potential Contaminant Source / Land Use Score - Zone III 2 1 1 0

Cumulative Potential Contaminant / Land Use Score 15 9 11 6

## 4. Final Susceptibility Source Score

9 8 8 8

## 5. Final Well Ranking

Moderate Moderate Moderate Moderate

## 1. System Construction

SCORE

Drill Date	09/05/1985	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1999
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	YES	0
Well located outside the 100 year flood plain	YES	0

Total System Construction Score 3

## 2. Hydrologic Sensitivity

Soils are poorly to moderately drained	YES	0
Vadose zone composed of gravel, fractured rock or unknown	NO	0
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0

Total Hydrologic Score 1

## 3. Potential Contaminant / Land Use - ZONE 1A

IOC Score VOC Score SOC Score Microbial Score

Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	0	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		2	2	4	2

## Potential Contaminant / Land Use - ZONE 1B

Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2 ) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or	YES	4	0	0	
4 Points Maximum		4	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B Greater Than 50% Irrigated Agricultural Land		4	4	4	4

Total Potential Contaminant Source / Land Use Score - Zone 1B 8 4 4 4

## Potential Contaminant / Land Use - ZONE II

Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	YES	1	0	0	
Land Use Zone II Greater Than 50% Irrigated Agricultural Land		2	2	2	

Potential Contaminant Source / Land Use Score - Zone II 3 2 2 0

## Potential Contaminant / Land Use - ZONE III

Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or	NO	0	0	0	
Is there irrigated agricultural lands that occupy > 50% of	NO	0	0	0	

Total Potential Contaminant Source / Land Use Score - Zone III 0 0 0 0

Cumulative Potential Contaminant / Land Use Score 13 8 10 6

## 4. Final Susceptibility Source Score

7 6 6 6

## 5. Final Well Ranking

Moderate Moderate Moderate Moderate